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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,323	03/02/2004	Edward Aloysius Fitzgerald	309.030	1825

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Eaton Corporation
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EXAMINER	
ROMAN, LUIS ENRIQUE	
ART UNIT	**PAPER NUMBER**
2836	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/791,323	FITZGERALD ET AL.	
	Examiner	Art Unit	
	Luis Roman	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,4,7-12 and 15-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,4,7-12 and 15-22 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/16/06 has been entered.

Accordingly claims 4, 8-11, 16, 17 & 19-21 have been kept original, claims 1, 7, 12, 15, 18 & 22 have been amended, claims 7, 15 & 22 have been previously presented and claims 2, 3, 5, 6, 13, & 14 have been cancelled. No new claims were added. It also included remarks/arguments.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, 7, 8, 10, 11, 12, 15, 16, 17, 18, 19, 21 & 22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hongel (US 4959746) in view of Sellers (US 68637898) and E. D. Long (US 3437188).

Regarding claim 1 Hongel discloses a device for preventing arcing between contacts (Fig. 4 element 10B) of a switching device as the contacts of the switching

device are opened, the switching device including a coil (Fig. 4 element 10A) for controlling the opening of the contacts, the device comprising: a coil suppression circuit (Fig. 4 elements 242, 244) connected in parallel with the coil, the coil suppression circuit dissipating the energy stored in the coil in response to the de-energizing of the coil (Col. 12 lines 38-41); a driver (Fig. 4 elements 250-300, 250-302) having an input operatively connected to the anode of the Zener diode (Fig. 4 elements 250-300, 250-302 <paths: anode of 242, 262, 282, base of 266 & 242, 262, 284, base of 274>) and an output (Fig. 4 elements 300<Q> & 302<Q>); and a first solid state switch having a gate operatively connected to the output of the driver (Fig. 4 element 26left<G> connected to 300<Q> & 302<Q>) and being connected in parallel with the contacts (Fig. 4 elements 26left, 10B), the first solid state switch movable between an open position preventing the flow of current there through and a closed position (Col. 4 lines 63-68 & Col. 5 lines 1-3); wherein the driver closes the first solid state switch in response to a reference voltage across the first Zener diode (Col. 11 lines 44-63), the first Zener diode providing a reference voltage generated by the de-energization of the coil (the most important usage of Zener diodes is as voltage reference/regulator since the current provided by the coil thru the diodes 242 and 244 circulates only in one direction due to 244 <circulates from D going up in this case> the Zener diode will operate in the negative part of the V-I characteristics providing a voltage which is considered constant <in other words may be considered as a voltage reference>).

Hongel discloses a Zener diode and a regular diode back to back where the voltage reference of the Zener diode 242 is applied to the control circuit between the points 230 connected to 10A and 230 connected to 264 but does not disclose having a first and a second Zener diode, including a first Zener diode having a cathode operatively connected to the coil and an anode; and a second Zener diode having a cathode operatively connected to the anode of the first Zener diode and an output,

Sellers teaches having a first and a second Zener diodes connected in series (Fig. 3A element 44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Hongel device with the teachings of Sellers because having

two Zener diodes will provide and stronger suppression and protection to the coil by clamping it.
E. D. Long teaches a reference voltage that is obtained at a node between two Zener diodes, signal that is connected to a switch (Fig. 5 elements 92, 94, Q1 & Col. 4 lines 19-39).
It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Hongel device with the teachings of E. D. Long because having a driver transistor connected to the middle point of a series of Zener diodes acting as a voltage divider adapts to the changes of current maintaining the voltages across them constant.

Regarding claim 4 Hongel in view of Sellers and E. D. Long discloses the device of claim 1.
Hongel further discloses wherein the driver (Fig. 4 elements 250-300 & 250-302) includes a timing device (Col. 2 lines 16-21 & Fig. 4 elements 320, 322) for closing the first solid-state switch (Fig. 4 element 26left) for a predetermined time period.

Regarding claim 7 Hongel in view of Sellers and E. D. Long discloses the device of claim 1.
Hongel further discloses wherein the driver includes a transformer (Col. 8 lines 61-65 & Fig. 4 element 252), the transformer having a primary side (Fig. 4 element 254) operatively connected to the coil suppression circuit (Fig. 4 elements 242, 244) and a secondary side (Fig. 4 element 256) interconnected to the gate of the first solid state switch (Fig. 4 element 26left<G>), the transformer transferring electrical energy from the coil suppression circuit to the gate of the first solid state switch.

Regarding claim 8 Hongel in view of Sellers and E. D. Long discloses the device of claim 7.
Hongel further discloses comprising a Zener diode (Fig. 4 element 310) connected in parallel with the secondary side (Fig. 4 element 256) of the transformer.

Regarding to claim 10 Hongel in view of Sellers and E. D. Long discloses the device of claim 1.
Hongel further discloses comprising a second solid-state switch (Fig. 4 element 300, where 300 is a multivibrator that changes states) connected in series with the first solid-state switch (Fig. 4 element 26left).

Regarding claim 11 Hongel in view of Sellers and E. D. Long discloses the device of claim 10.
Hongel further discloses comprising: a first diode (Fig. 4 element 368) connected in parallel with the first solid-state switch (Fig. 4 element 26) the first diode biased in a first direction; and a second diode (Fig. 4 element 374) connected in parallel with the second solid state switch (Fig. 4 element 300, where 300 is a multivibrator that changes states), the second diode biased in a second direction.

Regarding claim 12 Hongel in view of Sellers and E. D. Long discloses a bypass circuit.
Hongel further discloses the circuit for preventing arcing of electrical energy passing between first and second contacts (Fig. 4 elements 10B) of a switching device having a coil (Fig. 4 element 10A) wherein the contacts open and close in response to the energization of the coil, the bypass circuit comprising: a first switch connected in parallel with the contacts of the switching device, the first switch (Fig. 4 element 26left) movable between a closed position with the contacts open and an open position with the contacts closed; and an actuation circuit (Fig. 4 determined by elements 250-300, 250-302) interconnecting the coil (Fig. 4 element 10A) and the first switch (Fig. 4 element 26left), the actuation circuit closing the first switch in response to a voltage.
Hongel further discloses a Zener diode and a regular diode back to back where the voltage reference of the Zener diode 242 is applied to the control circuit between the points 230 connected to 10A and 230 connected to 264.
Sellers discloses having a first and a second Zener diodes connected in series (Fig. 3A element 44).

E. D. Long further discloses a circuit having a voltage reference device connected to a control switch (the pair of Zener diodes as voltage divider of E. D. Long are now connected in the place of Zener diode of Hongel), the voltage reference device providing a reference voltage generated by de-energization of the coil (the most important usage of Zener diodes is as voltage reference/regulator, they operate in the negative part of the V-I characteristics providing a voltage which is considered constant <in other words a voltage reference>) (Fig. 5 elements 92, 94, Q1 & Col. 4 lines 19-39).

Regarding claim 15 Hongel in view of Sellers and E. D. Long discloses the bypass circuit of claim 12.
Hongel further discloses wherein the driver is a transformer (Fig. 4 element 252), the transformer having a primary side operatively connected to the energy dissipation device (Fig. 4 element 242, 244) and a secondary side operatively connected to the first switch (Fig. 4 element 26left).

Regarding claim 16 Hongel in view of Sellers and E. D. Long discloses the bypass circuit of claim 12.
The bypass circuit of claim 12 wherein the electrical energy passing between the contacts has an AC waveform (Col. 1 lines 56-67; Hongel describe <US 3639808> which discloses a similar circuit for AC) and wherein the bypass circuit further comprises a second switch (Fig. 4 element 26right) operatively connected to the actuation (Fig. 4 element 252) circuit and being connected in parallel with the contacts (Fig. 4 element 10B) of the switching device, the second switch movable between a closed position with the contacts open and an open position with the contacts closed (Fig. 4 element 300, where 300 is a multivibrator that changes states).

Regarding claim 17 Hongel in view of Sellers and E. D. Long discloses the bypass circuit of claim 12.
Hongel further disclose the bypass circuit of claim 12 further comprising a second switch (Fig. 4 element 300, where 300 is a multivibrator that changes states) operating

connected to the first switch (Fig. 4 element 26left), the second switch controlling the rate of closure of the first switch.

Regarding claim 18 Hongel in view of Sellers and E. D. Long discloses a bypass circuit for preventing arcing of electrical energy passing between first and second contacts of a switching device having a coil (Fig. 4 element 10A) wherein the contacts (Fig. 4 element 10B) open and close in response to the energization of the coil, the bypass circuit comprising: a first switch (Fig. 4 element 26left) connected in parallel with the contacts of the switching device, the first switch movable between an open position and a closed position; an energy dissipation device operatively connected to the coil (Fig. 4 element 242); and a driver (Fig. 4 element 252) interconnecting the energy dissipation device and the first switch, the driver closing the first switch prior to the opening of the contacts in response to the portion of energy absorbed by the energy dissipation device (Col. 4 lines 63-68 & Col. 5 lines 1-3).

Hongel further discloses a Zener diode and a regular diode back to back where the voltage reference of the Zener diode 242 is applied to the control circuit between the points 230 connected to 10A and 230 connected to 264 for a predetermined time period generated by de-energization of the coil.

Regarding claim 19 Hongel in view of Sellers and E. D. Long discloses the bypass circuit of claim 18.

Hongel further discloses wherein the driver is a transformer (Fig. 4 element 252), the transformer having a primary side (Fig. 4 element 254) operatively connected to the energy dissipation device (Fig. 4 element 242) and a secondary side (Fig. 4 element 253) operatively connected to the first switch (Fig. 4 element 26left).

Regarding claim 21 Hongel in view of Sellers and E. D. Long discloses the bypass circuit of claim 18.

Hongel further discloses wherein the electrical energy passing between the contacts has an AC waveform (Col. 1 lines 56-67; Hongel describe <US 3639808> which

discloses a similar circuit for AC) and wherein the bypass circuit further comprises a second switch (Fig. 4 element 26right) operatively connected to the driver (Fig. 4 element 252) and being connected in parallel with the contacts (Fig. 4 element 10B) of the switching device, the second switch movable between an open position and a closed position (Col. 4 lines 63-68 & Col. 5 lines 1-3).

Regarding claim 22 Hongel in view of Sellers and E. D. Long discloses the bypass circuit of claim 21.
Hongel further discloses wherein the driver (Fig. 4 element 252) closes the second switch (Fig. 4 element 300, where 300 is a multivibrator that changes states) prior to the opening of the contacts (Fig. 4 element 10B) in response to the portion of energy dissipated by the energy dissipation device (Col. 12 lines 38-41 & Fig. 4 element 242).

Claim 9 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hongel (US 4959746) in view of Sellers (US 68637898), E. D. Long (US 3437188) and Beurrier (US 3694765).

Regarding claim 9 Hongel in view of Sellers and E. D. Long discloses the bypass circuit of claim 7.
Hongel in view of Sellers and E. D. Long does not disclose wherein the transformer has a turn ratio of 1:1.
Beurrier teaches wherein the transformer has a turn ratio of 1:1 (Col. 3 lines 1-7 and Fig. 1 element T).
It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Hongel in view of Sellers and E. D. Long device with the Beurrier device features because this application describes a coupling circuit for coupling one or more signal sources to a common load without disturbing any of the coupled circuits, then this isolation is highly desired when preventing arcing.

Claim 20 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hongel (US 4959746) in view of Sellers (US 68637898), E. D. Long (US 3437188) and Blain et al. (US 6347024).

Regarding claim 20 Hongel in view of Sellers and E. D. Long discloses the bypass circuit of claim 19.

Hongel in view of Sellers and E. D. Long does not disclose further comprising a varistor connected in parallel with the contacts of the magnetic switching device.

Blain et al. teaches further comprising a varistor connected in parallel with the contacts of the magnetic switching device (Col. 3 lines 66-67 & Col. 4 lines 1-2 & Fig. 1 element 50).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Hongel in view of Sellers and E. D. Long device with the Blain et al. device features because the varistor provides extra protection for overvoltages which is the main purpose of this circuit (prevent arcing).

Response to Arguments

Applicant's arguments filed 10/16/06 have been fully considered but they are not persuasive.

Hongel device relates to a relay contact protective circuit and particularly to such a circuit for protecting relay contacts carrying high values of direct current.

A contact protective circuit for a relay comprises means for detecting a transient in the relay-operating coil, and a low "on" resistance, metal oxide semiconductor field effect transistor having its drain-source circuit connected across the relay contacts for shunting the contacts when the transient occurs. A timing means, responsive to the transient detection and coupled to the gate terminal of the field effect transistor, gates the field effect transistor to an on condition, diverting current around the said contacts at least as soon as the contacts begin to open or close. The timing means preferably comprises a monostable multivibrator sustaining conduction through the field effect

transistor until the contacts are completely opened or completely closed including relay bounce time (in other words the circuit is a protection for the contacts against high currents <arcing>).

Hongel device has a coil suppression circuit that operates when the coil is de-energized. It comprises a Zener diode and a regular diode back to back where the voltage reference of the Zener diode 242 is applied to the control circuit between the points 230 connected to 10A and 230 connected to 264 when the coil is de-energized.

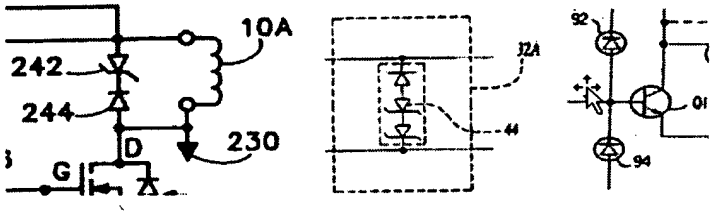
The combination of Hongel'746), Sellers'898 and E. D. Long'188 teach:

1) The cathode of the first Zener diode is connected to a coil;

2) The input of a driver is operatively connected to the anode of the first Zener diode; and

3) a reference voltage is generated across the first Zener diode by de-energization of the coil.

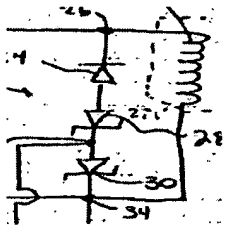
Following the sequence of drawings below and rejection of claim 1 will help to understand the combination.



Hongel'746

Sellers'789

E.D.Long'188



Application: US 10/791323

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis E. Román whose telephone number is (571) 272 – 5527. The examiner can normally be reached on Mon – Fri from 7:15 AM to 3:45 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272-2800 x 36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from Patent Application Information Retrieval (PAIR) system.

Status information for unpublished applications is available through private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Luis E. Román
Patent Examiner
Art Unit 2836

LR/010607

Stephen W Jackson
1-8-07

STEPHEN W. JACKSON
PRIMARY EXAMINER